TEST FOR DISTINGUISHING BETWEEN SCHIZOPHRENOSES AND PSYCHONEUROSES

A STUDY IN ABNORMAL PSYCHOLOGY

A Thesis submitted to the Faculty of the Graduate College of the State University of Iowa, in partial fulfillment of the requirements for the degree of Doctor of Philosophy

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THE psychopathologist, who does not wish to confine his observations to a purely superficial symptomatology or a merely histological morphology, must seek above all to penetrate as deeply as possible into the nature of the general and specific reactions of the living organism to stimulaton. And it seems reasonable to infer after some perusal of the literature, that psychopathologists and psychologists are coming, more and more, to demand objective, quantitative, and empirical criteria by which to characterize the behavior of the living organism, be that organism normal or abnormal. Many different workers in Europe and America are recognizing that the merely symptomatological classification of cases is misleading and confusing, and on the other hand, that a mechanistic and objectively empirical classification is highly necessary and practical.

Now what are some of the reasons for demanding objective tests in diagnoses and classifications? One immediately comes to mind. In the mild and prodromal stages of various functional neuroses the matter of diagnosis becomes a very difficult one. The general physical and mental picture is hazily defined and the symptoms are just beginning to be slowly accentuated into recognizable complexes. In these stages the psychotics are scarcely distinguishable from the normals so that either a great

* The research here reported is the third of a series of studies bearing on the variability of liminal values. The controlled conditions have been fundamentally the same in all three studies but the different types of individuals exposed to the experimental settings have furnished the bases for the different researches. The first study, "Studies in Dissociation," *Journal of Experimental Psychology*, Volume V, No. 5, October, 1922, dealt entirely with normal individuals. The second paper, "Suggestibility and Negativism as Measured by Auditory Threshold During Reverie," THE JOURNAL OF ABNORMAL PSYCHOLOGY AND SOCIAL PSYCHOLOGY, Volume XVIII, January-March, 1924, 350-368, considered both normal and abnormal individuals. The present paper concerns itself only with abnormal subjects. It includes the employment of hypnosis, reaction times, and investigation into another sense field.

number of truly psychotics is diagnosed as normal or many normals as psychotic. Yet the two should be as correctly distinguished when the psychotic is only mildly deranged or in a prodromal stage as when he is in the fully developed period of a mental disease.

The ideal achievement, therefore, is to be able properly to classify the abnormal regardless of the period or stage of development of the disorder in which he is seen, for it is highly important that an accurate diagnosis be determined as early as possible in order that treatment may be begun without delay. It is the initial stage of the disease which is especially susceptible to treatment. This can be emphasized by an actual case.

A girl, seventeen, was received by the Psychopathic Hospital as an emergency case. She had attempted suicide by cutting her throat with a dull butcher knife, but gave it up before any serious wounds had been inflicted. She had a delusion the content of which had to do with her becoming pregnant by being touched on the back by a boy. Queer sensations bombarded her, such as the empty feeling of her head, the lifelessness of her body, the funny feelings in her temples, and the feeling of all thoughts having left her. She was disinterested, emotionally apathetic, indifferent, and superficially negativistic. Her glance was shifty and indirect. She refused to accompany the experimenter to the laboratory alone, demanding that a nurse go along. Her personal appearance was untidy, her hair being ill-combed, and her clothes slouchily worn. She went about with her head lowered and her shoulders stooped. To anyone versed in symptomatological classification she presented the picture of hebephrenic dementia praecox. At a time when this diagnosis was generally thought of in her connection, she was put through the experiment described in this paper and the results indicated a suggestible personality of the psychoneurotic, rather than of the schizophrenic group. Hypnoanalysis,[1] rather than a straight psychological analysis, was then attempted. At the first seance very little was accomplished, but at the second, complete hypnosis was induced and good psychotherapeutic material unearthed. She became coöperative, accompanying the experimenter to the laboratory without question, and intelligently assisted in the solving of her difficulties. Within a very short time her entire picture

[1] For the use of this term see W. S. Taylor, "A Hypnoanalytic Study of Two Cases of War Neurosis." THE JOURNAL OF ABNORMAL PSYCHOLOGY AND SOCIAL PSYCHOLOGY, December, 1921.

was just the reverse of that described above. She became interested, friendly, and alert. Her appearance was neat and pleasant, an erect position being assumed, and the clothes and hair tastefully worn. She admitted her sex impulses as her own and began to deal with them in a normal manner. Plans for the future were discussed and outlooks of various vocations considered.

The follow-up section of the social service department pronounce her cure as probably permanent. This pronouncement is based upon communications periodically received from the patient's guardians.

This case, like many others, indicates that purely symptomatological classification of cases is misleading and insufficient. Additional objective criteria must be called into service. Especially is this inadequacy felt in the initial phases of a great many mental diseases, where on the other hand the greatest security should prevail if speedy and proper treatment is to be given.

A second reason for demanding objective tests is the need of our psychopathic hospitals for shorthand devices and reliable measuring instruments by which accurate diagnoses can be determined within a very short time after patients are admitted. These hospitals are in a certain sense relay stations, situated between the public and the insane asylums, from which patients are being constantly transferred, committed, or returned to society. Seldom are cases of long standing to be found in psychopathic hospitals. This means that the main function of these hospitals is to diagnose and consign, and to diagnose in a limited period of time under limited facilities for prolonged investigation and study. Under these conditions any trustworthy test for differential diagnoses would be acceptable.

A third reason for an objective and reliable test is the difficulty of differential diagnosis in the case of many mental diseases. Sometimes an apparently clear-cut case of the paranoid variety of schizophrenia proves to be a functional condition. There is also a type of case which presents a symptom-complex of puerilism and pseudo-dementia and still further confused for diagnostic purposes by a clownish manner that is difficult to separate from the bizarre manner of a dementia praecox. The simple childish manner of this type of case demands a careful discrimination between a "flight into childhood" and hebephrenic dementia. Another difficult task for the diagnostician is to distinguish between automatic negativistic conditions and impulsive movements in hysterical complexes.

Many writers have pointed out the close similarity between shell shock and mild dementia praecox, and have commented upon the apparent dementia in a chronic Ganser's syndrome.

There is still another type of case which is confusing from a nosological point of view. It is the one which is apparently hallucinated, but which will eventually admit the phantasy background for the hallucinations. The slowly developing cases of hebephrenia must be distinguished from acquired neurasthenia. This differentiation usually depends upon a long observation taking into consideration from the standpoint of the hebephrenic, the signs of dementia, the silliness of the hypochondriacal delusions, emotional apathy, and the fact that the patient does not improve with quiet and relaxation. None of these evidences can be determined in a short time.

Lastly there is a large number of cases that present at the outset clear symptoms of hysteria, but which later, after the lapse of considerable time, show unmistakable evidence of the deterioration of dementia praecox.

On the whole psychiatrists feel in regard to the diagnosis of dementia praecox that they are on quite uncertain ground. No one as yet has spotted the underlying factor or factors which bind all the symptoms together into a diagnostic unit. It is true that Kraepelin and Bleuler have done some masterly work in the grouping of the symptoms which characterize this disease. But when all is said on the subject there appears much to be desired, and no unifying synthesis is even approached.

This study has to do with distinguishing between the schizophrenoses and the psychoneuroses which are often confusing from the diagnostic point of view. Especially is this true in the prodromal stages of these two groups. Yet, as has been pointed out above, it is highly important that a correct differential diagnosis be made as early as possible so that proper treatment may be begun in the initial stages where it is most effective.

The experiment here described presents a certain, quite definite situation which elicits a comparatively definite and clear-cut response. The type of response varies according to the kind of organism making the response, and to determine the kind of individual exposed to the environmental conditions of the experiment, the type of response is taken as the criterion. Now if it is found that the psychoneurotics respond one way to a definite situation, while the dementia praecox patients respond in an opposite way to the same situation, it does not seem illogical to infer that here

is a situation which might act as a differential test. If a test is devised to obtain the reaction of an hysteric, who we know is suggestible and extrovertive, and the response of a dementia praecox, who we know is negativistic and introvertive, and these responses are found to be diametrically opposed, it seems safe to conclude that a measurement of the predominant characteristic of each has been made.

This study represents a single pragmatic attempt in which response differences are used to differentiate cases. Thus the chief purpose of the research is to determine a definite kind of behavior relative to a certain environment characteristic of the hysteric on the one hand and of the schizophrenic on the other. It is an effort experimentally to detect suggestibility and its antithesis, negativism.

THE NATURE OF THE PROBLEM

This whole problem is one of liminal values. The cutaneous and auditory fields have been the ones that have offered the most accessible and ready approach. For each individual, in the course of the same experiment, three thresholds are obtained; one before the crystal gazing period, one during, and one after. The threshold obtained during the crystal gazing period is compared with the other two. That is to say, some patients during periods of crystal gazing experience a lowering of the threshold value as compared with that before or after, while others experience a rise in the threshold during crystal gazing as compared with that before or after. The patients that have the lowered threshold during states of abstraction are found to be the psychoneurotics, while those whose thresholds rise during crystal gazing are found to be dementia praecox or manic-depressive cases. This should not be surprising when it is considered that practically every worker in the field of mental diseases recognizes that the psychoneuroses and the schizophenoses are clinically, diametrically opposed states. The psychoneurotic is characterized by taking into his ego "as large as possible a part of the outer world", by largeheartedness, impressionability, a widening of the ego, introjection, susceptibility, suggestibility, expansiveness, and interest in things, while the schizophrenic is characterized by a detachment of his interest from the outer world, by a restriction of his reactions, by regression, negativism, autistic withdrawing into his own self, and inaccessibility.

The dementia praecox patient may be likened to a man who

goes into his house and closes all the doors and windows in order to keep any extraneous factors from breaking in on his contemplations and broodings, while the hysteric may be likened to a man who goes into his house and leaves all of the doors and windows open in order that outside influences may have their greatest effect upon him.

If patients were arranged along a straight line the dementia praecox individual would have to be placed at one extreme end and the hysterical at the other extreme end. On the dementia praecox side of the line would come the paranoiacs and the manic-depressives and on the side of the hysterical would come the subgroups of the psychoneuroses.

Now what is proposed is a test which will take advantage of the underlying mechanisms of the two main groups of mental diseases under discussion. That is, take advantage of the mechanism of regression, resistance, negativism, etc., in the case of the dementia praecox and of the mechanism of impressionability, transference, suggestibility, etc., in the case of the hysterical. Hypnosis, when it works, is a test so to speak, which takes advantage of the underlying mechanism of one group, the psychoneurotic, in a positive manner, and in the case of the dementia praecox group, in a negative way. It is a known fact, however, that all psychoneurotics, although suggestible, cannot be hypnotized by all workers, since in hypnosis there is too much dependence upon the establishment of certain personal relationships. Thus with hypnosis alone it would be impossible to distinguish between those psychoneurotics who could not be hypnotized and the dementia praecox patients. A successful test should do all that hypnosis does without being dependent upon certain conditions which cannot be established in all cases. Such a test could be one in which day-dreaming, reverie, and abstraction were involved. This could be accomplished in a purely scientific manner, which would be independent of the personal equation so important in hypnosis.

We know that in hypnosis the sensory acuity of the various senses can be increased and that the individual can be made hypersensitive so to speak.[2] We also know that day-dreaming, abstraction, and reverie approach and border on the hynotic state, but do not depend upon certain personal relationships being established between experimenter and observer and for this reason can be

[2] Moll, Dr. Albert. Hypnotism. New and enlarged edition. Charles Scribner's Sons, New York, 1919, pp. 97-101.

used in a standardized test. Now if an individual can be made to day-dream by means of certain artificial conditions, it seems reasonable to suspect that his sensory acuity would increase and consequently his sensory thresholds lower. On the other hand if an individual is not able to day-dream in a certain artificial condition but who is especially resistive, critical, and seclusive when there is the slightest chance of his being caught off guard, it appears that his sensory acuity would decrease and consequently his sensory thresholds would rise.

This paper has to do with an artificial situation which is very conducive for bringing about day-dreaming, reverie, and abstraction in the case of the psychoneurotic and as equally conducive for bringing about an increased resistive set in the case of the schizophrenic and a means whereby variability of the sensory thresholds can be detected in these artificially induced states.[3]

EXPERIMENTAL DATA

The data present fifty-nine cases. There are twenty-two psychoneurotics, twenty-four dementia praecox patients, two manic-depressive individuals, and eleven organic psychotics of some sort or other, including epilepsy, general paresis, feeblemindedness and basal gangliar syndrome. It is somewhat accidental that the eleven organic cases are included. Most of the tests were made before the diagnoses were determined or at least were made in ignorance of any diagnoses. Any available and accessible cases were taken and consequently when they finally came to be diagnosed some of them did not fall within our two main groups, the dementia praecox and the psychoneurotic. The eleven are included rather than excluded because of the light that may be shed on the underlying mechanisms of some of those mental disorders which have a determined organic pathology. Insight may also be gained relative to the so-called functional disorders by comparing the results in regard to this experiment with those of the organic psychoses.

Table I is a condensed statement of the experimental findings. Here it is seen that the thresholds of all psychoneurotics lowered during crystal gazing; that the thresholds of twenty-one dementia

[3] For a description of the apparatus and method see the writer's previous article, "Suggestibility and Negativism as Measured by Auditory Threshold During Reverie." THE JOURNAL OF ABNORMAL PSYCHOLOGY AND SOCIAL PSYCHOLOGY, 1924, XVIII (January-March), 350-368. It should be noted, however, that the present research has made use of reaction times and hypnosis and has carried the investigation into the cutaneous sense field.

TABLE I

Kind of Cases	Number of Cases with Lowered Threshold During Crystal Gazing	Number of Cases with Raised Threshold During Crystal Gazing	Number of Cases with Shorter Reaction Time During Crystal Gazing	Number of Cases with Longer Reaction Time During Crystal Gazing	Number of Cases with Contradiction in the Two Fields in Regard to Reaction Time During Crystal Gazing	Number of Cases with the Reaction Time of the Crystal Gazing Period Between that of the Pre- and that of the Post-Crystal Gazing Period	Number of Cases with no Reading in Reaction Times	Total Number of Cases of Each Kind
Psychoneurotic	22	0	12	4	4	2	0	22
Dementia Praecox	3	21	3	15	0	1	5	24
Manic-depressive.	0	2	0	1	0	1	0	2
Organic	8	3	6	3	0	1	1	11

praecox patients rose while three lowered during crystal gazing; that the two cases of manic-depressive insanity experienced a rise during crystal gazing; and that eight of the organic cases experienced a lowering while three had a raising of the threshold during crystal gazing.

It should be noted that if a patient experienced a lowering of his auditory threshold during crystal gazing, he also experienced a lowering of his cutaneous threshold during crystal gazing, provided he was tested in the two fields. There is the same one to one correspondence in the two fields of direction of change during crystal gazing in regard to those cases whose thresholds rose. That is, if a patient were tested in both sense fields and his threshold on one of the fields rose during crystal gazing, it would also rise during crystal gazing in the other field.

The majority of the cases were tested in only the auditory field due to the fact that many of the patients manifested a fear and suspicion of the electrical shocks which made it almost impossible to obtain the proper coöperation necessary for the successful carrying out of the experiment.

In reference to those patients whose thresholds lowered during the crystal gazing period, responding did not cause their crystal gazing thresholds to come back to the ones determined before, as shown by the fact that they continued to respond to subliminal stimulation during the crystal gazing period even after they had once responded. This indicates that the set or attitude of the

crystal gazing period is quite permanent and is capable of being rigidly maintained for a considerable length of time. This fact can be made clearer by an actual case.

The threshold of CH-1, a conversion hysteric, before crystal gazing was 12. During crystal gazing he was given a tone of intensity 10 to which he responded. Now one might think that this responding would arouse the observer and cause his threshold to return to 12. Such, however, is not the case. He now responded to 10, 8, and 6, but refused to respond to 5. Thus it is seen that responding does not affect the condition of the lowered threshold. The same fact holds true of the patients who experienced a rise in the threshold during crystal gazing. Responding does not change his set and cause the threshold to lower to the one determined before the crystal gazing period. The threshold of MD-2, a manic-depressive individual, before crystal gazing was 20. During crystal gazing 60 was necessary to elicit a response. Then 55 was given three times without being responded to. When 60 was given again a response was made. In a few instances this raised threshold set was not as rigidly maintained as in the case of this patient. In no case, however, did the crystal gazing threshold, which was higher, come back down on account of responding to the one ascertained before or after crystal gazing. In some cases it came down slightly.

In regard to reaction time, in the case of psychoneurotics, it is seen that there is no one to one relation between a faster reaction time during crystal gazing and a lowered threshold during crystal gazing. Neither does the individual who is hypnotized always respond more quickly during hypnosis than he does during the normal periods. In the majority of cases, however, whenever there is a lowered threshold, there is a shortened reaction time. Twelve of the psychoneurotics had a shorter reaction time during crystal gazing; four had a longer reaction time; four had a longer reaction in one sense field, while a shorter one in the other; and two psychoneurotics had a reaction time during crystal gazing which stood between the reaction time of the pre-crystal gazing and that of the post-crystal gazing period. It is to be noted that none of the four cases which had shorter reaction times in one sense field during crystal gazing and longer in the other during the same period are included in the twelve with the faster reaction or in the four with the slower reaction.

In the case of the nineteen dementia praecox patients, whose reaction times were obtained, five of these patients receiving no

readings, there were fifteen who had slower reactions during crystal gazing, three who had faster reactions, and one whose reaction time during crystal gazing stood between that of the preceding and following periods.

One of the manic-depressive patients had a slower reaction time while the others had a reaction time which was between that of the pre-crystal gazing and that of the post-crystal gazing period.

Out of the eight organic cases whose thresholds lowered during crystal gazing, six of them had shorter reaction times during the same period, one had a reaction time which stood between those of the other two periods, and one received no reaction time rating. All of the organic cases whose thresholds rose during crystal gazing had longer reaction times during the same period.

Eight of the cases were hypnotized. Six out of the eight were diagnosed psychoneurotic, while two of them were diagnosed dementia praecox, one of the simple, the other of the hebephrenic type. All of the eight experienced a lowering of the threshold during crystal gazing and during hypnosis. In most instances the increase in sensitivity was more marked in the hypnotic state than during the crystal gazing period. The reaction times of the cases under hypnosis were shorter in regard to three of them, longer in regard to three, and between that of the pre- and post-crystal gazing periods in regard to the two.

RESTATEMENT AND INTERPRETATION

Nearly all writers are agreed that dementia praecox is characterized by negativism, detachment of interest from the outer world, auto-eroticism, expelling from the ego the impulses that have become unpleasant, shrinking of the ego, projection, and resistance to environmental factors. The schizophrenic and the manic-depressive patients attempt to block or cover every possible avenue of approach which might possibly lead to their conflicts, the former by resisting, the latter by a continual stream of diverting activities. The praecox case restricts his capacity to be interested in matters other than himself and consequently regresses. This withdrawing into his own fantasies makes every influence acting from without an unwelcome interruption so that resistance comes not only to suppress reaction to external influences, but to actively oppose interference of all sorts.

There is found just as complete agreement among workers in regard to characterizing the psychoneurotics as there is in characterizing the dementia praecox cases. The psychoneurotics are

distinguished by "taking into the ego as large as possible a part of the outer world", suggestibility, widening of the ego, introjection, impressionability, indulgent day-dreams, and interest in external things.

Thus we see that fundamentally these two groups stand in diametric opposition to each other; one characterized chiefly by negativism and resistance, the other by suggestibility and impressionability.

Now the questions arise, Is it possible to objectively determine and indicate whether or not a patient possesses one or the other of these traits? or, Can a test be devised that would differentiate patients in regard to these two traits? and, If such a test could be devised would it be a differential test between dementia praecox and the psychoneuroses?

This paper presents data to justify a means by which such a differential determination between dementia praecox and psychoneurotic cases can be made. The empirical basis for asserting that a differential test has been found is set forth in the immediately preceding chapter where we find that all patients diagnosed as psychoneurotic experienced a lowering of the sensory threshold during crystal gazing, while all dementia praecox cases except three, experienced a rise in the sensory threshold during crystal gazing. In terms of figures this means that every one of the twenty-two psychoneurotics tested had a lowering of the threshold during crystal gazing period and twenty-one of the twenty-four dementia praecox patients tested experienced a rise in the crystal-gazing threshold. Now the question arises, Does the lowering of the threshold during crystal gazing of the three dementia praecox patients invalidate the differential power of the test? The first point to be considered in answering this question is that any clinical picture and diagnosis is crude in comparison with the findings of an accurate and carefully controlled test. This can be made clearer by citing an instance taken from internal medicine where the findings of the clinical diagnostician in the case of diphtheria were negative but where the laboratory findings were clearly positive. The laboratory findings in this instance will surely determine the treatment. Thus the diagnoses of these cases of dementia praecox might not be correct. We are inclined to believe that they are not correct in regard to two of the patients, one diagnosed as hebephrenic dementia praecox, the other as simple dementia praecox. Both of these patients were hypnotized. If these were catatonic dementia praecox individuals, we

could not be so sure that being hypnotizable marked them as psychoneurotic rather than dementia praecox for catatonia is a sypmtom complex, possibly independent in many instances of a dementia praecox condition, and is often marked by suggestibility and command automatism. These two patients, however, were not catatonic in any sense of the term. Hence it seems reasonable to infer that possibly, if all the facts were in, and a refined technique used, they would be diagnosed psychoneurotic as this test indicates that they were. The third dementia praecox patient, who experienced a lowering of the threshold during crystal gazing, was diagnosed as paranoid dementia praecox. This individual was not hypnotized, but during five interviews with her, all the signs of a strong positive transfer were manifested. Of course this is not definite or possibly even suggestive evidence that this individual was not of the praecox make-up, but it raises a point, which must not be overlooked.

It seems quite permissible then to consider that there is really only one exception to a perfect correlation between a rise of the threshold during crystal gazing and the diagnosis of dementia praecox in regard to the cases tested. This one exception is the last case discussed, and as we have just stated there may be other phenomena entering in which were not taken into account in the diagnosis.

Thus within the reliability of our data it should not be considered a transgression of the bounds of ordinary possibility to assume that we have a differentiating test between dementia praecox and the psychoneuroses.

There is another consideration which seems of sufficient importance to warrant mention at this point, namely, the influence of the central set upon the threshold value of the stimulus.

It is known, as Sherrington so well writes, that "The main function of the receptor is therefore to lower the threshold of excitability of the arc for one kind of stimulus, and to heighten it for all others."[4] This refers to "the adequate stimulus", "selective excitability", and "mode of excitation" rather than to features of conduction in reflex-arcs and higher nervous centers.

It is also known in regard to the receptor that there is a physiological range having to do with intensity within which range stimuli must fall if they are to receive a liminal evaluation.

[4] Sherrington, Charles S. The Integrative Action of the Nervous System. Charles Scribner's Sons, New York, 1906, p. 12.

It is reasonable to believe, however, that rarely do individuals experience as weak a stimulation as the lower physiological limit of a receptor will permit. The majority of individuals in normal circumstances are barely able to receive stimuli, the intensity value of which probably fall considerably above the intensity value of stimuli capable of being received by a particular sense organ. Even when a subject is taken into the laboratory and all the factors of adaptation, accommodation, and familiarity with the stimulus are taken into account, does he rarely, if ever, sense stimuli at the lower physiological limit of his threshold range. Now it would appear that if one rarely experienced his complete physiological capability of sensing stimuli as far as the receptor is concerned, some central factor or factors are involved in helping to determine the intensity of stimulation to which he is sensitive. That is to say, the liminal value is not solely dependent upon the sense organ, but in a great measure is determined by a central set or attitude. The lowering or raising of the threshold during the crystal gazing period seems to bear this out. Here, surely nothing is done to the sense organ or receptor. Its physiological range for the reception of stimuli undoubtedly remains unaltered, but the subject's ability to sense certain intensities of stimulation is unquestionably changed as is shown by the data. This change we are inclined to believe can be referable to the action of the conductor and intercalated nervous structures mediating between receptor and effector rather than to the receptor. Sherrington undoubtedly approached this problem in his discussion of the "much greater variability of the threshold value of stimulus (in the case of reflex arcs) than in nerve trunks."[5] This difference, as is well brought out by this author, between reflex-arc and nerve-trunk conduction is referable to that part of the arc which lies in the gray matter, more specifically to that part of the nervous system termed the synapse. In psychological terms, central blockings and inhibitions, and mental sets and attitudes help to determine the threshold value. To say then that the limen is a function of the sense organ, and of that alone, is surely unsound.

It is well shown by Sherrington that the phenomena of inhibition, summation, greater variability of threshold values, and interference are referable to central factors and not to peripheral structures such as the sense organ. The nature of the instructions

[5] Sherrington, Charles S. The Integrative Action of the Nervous System. Yale University Press, New Haven, 1920, p. 14.

given to the subject in the case of this study, also point to the change in threshold values as due to central factors. The patient is told to day-dream, to abstract, to build air-castles, to let himself go, in fact, to remove all inhibiting and blocking elements, thus making himself subject to incoming stimuli, provided of course he is able to carry out the instructions. If he is not able to fulfill the intention of the instructions, but on the other hand, actively or passively resists the possibility of being stimulated while off guard, increased resistances are brought into operation so that a change of the liminal value is produced in the opposite direction from that of the patient who can enter wholeheartedly into the reverie.

Therefore we conclude that the raising or lowering of the threshold during crystal gazing is referable to central factors and not to peripheral.

It is well to say a few words in regard to how central factors can alter the threshold value.

The hysteric indulges freely in day-dreaming which is the mildest form of dissociation and which involves unrestrained association. In this state he becomes lost in reverie, all restraint is disbanded and self-control is lost sight of. Every attentive process and critical judgment is in abeyance so that automatic responses easily operate. These facts are made clearer by recalling the method of experimentation.

The subject's threshold before crystal gazing is obtained with the instructions to attend strictly and faithfully to the stimuli. As the stimuli become fainter he is to apply greater effort in an attempt to sense them. Now the threshold during crystal gazing is obtained with the instructions to be neutral to the stimuli, to lose the self in reverie, and to let the mind wander wherever it will. The suggestible person accepts these instructions fully so that the contrast in the mental processes of the two periods, before and during crystal gazing, is very marked. The direction of attention before crystal gazing is on the stimulus, while during crystal gazing it is on the dream or fantasy of the reverie, making the responses during the latter period quite automatic. As is well shown in the literature on this subject, mild dissociation and hypnosis can be made by suggestion to be accompanied by an increase in sensory acuity. It is also pointed out that if any responses are made during these states, they are, to a greater or lesser extent, automatic. Thus the suggestible patient while crystal gazing, if he responds at all, will respond more or less

automatically; and as automaticity implies greater readiness to respond to stimuli than is ordinarily found in attentive, conscious states, a lowered threshold will occur.

As to why the crystal gazing threshold of the dementia praecox patient should rise, let us again recall the method of experimentation.

Before crystal gazing the dementia praecox individual may have as low a threshold as the hysteric because he attends in about the same manner to the stimuli as does the hysteric. During crystal gazing, however, when the schizophrenic is told to day-dream, his attention becomes directed against any such procedure and he remains controlled by attentive processes with an additional resistance of a disinclination to let himself go. It is not certain whether the resistance is directed against the very act of day-dreaming itself or whether it is directed against the experimenter's ascertaining by means of stimuli what the day-dream concerns.

The dementia praecox patient reacts under greater control during crystal gazing than in the other two periods, in order to make doubly sure that no stimuli interrupt his egocentric broodings. If he actually indulges in day-dreaming the array of resistances and inhibitions stand guard so to speak, permitting only relatively intense stimuli to arouse him.

To sum up then, it is seen, first, that the lowering or raising of the threshold during crystal gazing is due to a central set or attitude and not to any change in the receptor; and, second, that crystal gazing favors the hysteric in becoming dissociated while it causes the dementia praecox case to have added resistance brought to bear against incoming stimuli.

SUMMARY

1. It seems reasonable to think that psychopathologists and psychologists are demanding objective and empirical differential tests which will apply to any period of the mental disease under consideration. Many mental diseases are confusing from a diagnostic viewpoint, especially in the prodromal stages and as treatment depends on an accurate diagnosis, the diagnosis should be made early and accurately.

"Clinically, it is held by all workers that the schizophrenoses and the psychoneuroses are two diametrically opposed groups, the former characterized by negativism and restriction of reactions, and the latter by suggestibility and expansion of behavior.

3. If these two groups are clinically opposed and represented undoubtedly by underlying mechanisms of an antithetic nature, it seems that an experiment could be devised which would take advantage of this difference, thereby acting as an objective differential test.

4. A test is described by which it is possible to compare the reactions of a patient under quite normal conditions with the reactions of the same patient under certain sudorific circumstances. The reactions consist of responses to auditory and electrical stimuli, and the comparison is made on the basis of threshold values. That is, the threshold of the normal period is compared with that of the crystal-gazing period.

5. Fifty-nine cases were tested, twenty-two psychoneurotics, twenty-four dementia praecox patients, two manic-depressive individuals, and eleven organic psychotics. The psychoneurotic and dementia praecox cases are considered in the main as bearing directly on the problem of the thesis.

6. All of the psychoneurotics experienced a lowering of the threshold during crystal gazing. All of the dementia praecox cases except three, about whom there is considerable doubt as to the accuracy of the diagnoses, experienced a rise of the threshold during crystal gazing.

7. Several of the psychoneurotics and two of the three dementia praecox patients, whose diagnoses are questioned, were hypnotized. All cases experienced a lowering of the threshold during hypnosis.

8. The direction of change of the length of the reaction time during crystal gazing or hypnosis was not of sufficient uniformity to warrant any conclusions being made from reaction times.

9. On the bases of the two groups being clinically diametrically opposed and reacting consistently in regard to the lowering or raising of the threshold during a certain artificial state in opposite directions, it is held that a differential test has been found.

10. The alteration of the liminal value during crystal gazing is thought to be due to a central set or attitude and not to any peripheral factors such as changes in the receptor.

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